



Blind Stick For Visually Impaired People Using Voice Commands

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Abstract: In this high-tech era, technology has made it possible that everyone can live a comfortable life. But somehow the physically challenged people need to depend upon others in their daily life which ultimately makes them less confident in an unfamiliar environment. But nowadays the explosion of innovative technology provides many opportunities for them to live confidently without feeling as a burden. So, in this project, an intelligent device is represented for visually challenged people to guide them to reach their destination place safely without facing any difficulties. It consists of Arduino controller, voice module along with Ultrasonic sensor. Blind people find it difficult to move in this world as they get distracted by the obstacles, they may even get lost. So in the proposed system the above mentioned cases are taken into consideration and implementation is provided. In order to help the blind people for detecting object the proposed system make use of ultrasonic sensors to track the person. The system makes use of voice module and speaker to find the objects. The main objective of this project is to reduce the cost and to provide a better solution for the visually impaired

Index Terms - Blind stick, ultrasonic sensor, Obstacle recognition, Arduino.

I. INTRODUCTION

Blind people find it difficult to move in this world as they get distracted by the obstacles, they may even get lost. So, in the proposed system the above-mentioned cases are taken into consideration and implementation is provided. To help the blind people for detecting object the proposed system makes use of ultrasonic sensors to track the person. The system makes use of voice module and speaker to find the objects. The main objective of this project is to reduce the cost and to provide a better solution for the visually impaired.

An embedded system is one kind of a computer system mainly designed to perform several tasks like to access, process, and store and also control the data in various electronics-based systems. Embedded systems are a combination of hardware and software where software is usually known as firmware that is embedded into the hardware. One of its most important characteristics of these systems is, it gives the o/p within the time limits. Embedded systems support to make the work more perfect and convenient. So, we frequently use embedded systems in simple and complex devices too. The applications of embedded systems mainly involve in our real life for several devices like microwave, calculators, TV remote control, home security and neighborhood traffic control systems, etc.

II. LITERATURE REVIEW

In existing method Blind people generally use either the typical white cane or the guide dog to travel. The white cane is a widely used mobility aid that helps blind people to navigate in their surroundings.

Smart blind stick is an innovative stick which is designed for visually impaired people for improved navigation. The smart stick proposed by M. P. Agrawal [1] can identify all obstacles in the path using a water

sensor, ultrasonic sensor, RF module and GPS-GSM module installed in it and pass it on as vibrations to notify the user about hurdles on the way.

A blind stick named iWalk by R. F. Olanrewaju [2] has a water sensor integrated therein that activates a distinct buzzer if it detects water. The system also has a wireless RF remote control that produces a sound when pressed, which helps in locating the stick.

A stick guide model was proposed by K. B. Swain [3] which consists of GPS and GSM which sends SMS whenever the person needs help. It uses an ultra-sonic sensor to detect obstacles and an infrared sensor for level detection.

Nadia Nowshin [4] proposed an Arduino Nano based stick which detects the obstacles using Ultrasonic sensors and an android mobile application to help a blind person.

Radhika R [5] developed a model which can detect obstacles within the distance of about 3m with the help of infrared, ultrasonic and water sensors. The blind person can also communicate his location to his guardian using GPS and GSM modules

III. PROPOSED SYSTEM

The working behind this blind stick is that it is used for special purpose as a sensing device for the blind people. It is used widely to detect objects using Ultrasonic sensor. If any object is present, the ultrasonic sensor detects the object by measuring the distance between the object and the user and sends the data to the Arduino. To determine the distance of an object, calculate the distance between sending the signal and receiving back the signal. If any object is present near the user the audio will play using speaker. The block diagram of proposed method is shown in Fig1.

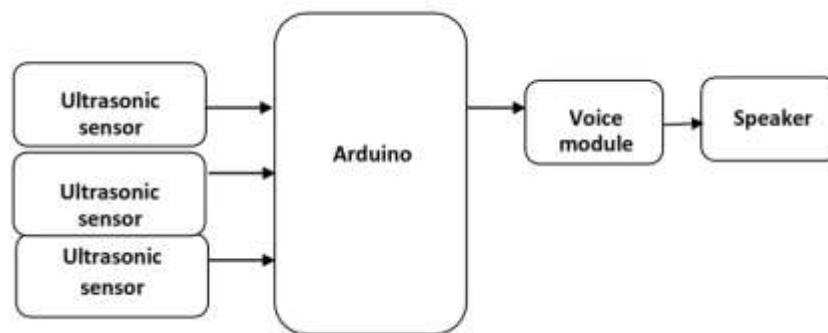


Fig 1: block diagram of proposed method

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ARDUINO NANO

The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328 (Arduino Nano 3.0) or ATmega168 (Arduino Nano 2.x). It has more or less the same functionality of the Arduino Duemilanove, but in a different package. It lacks only a DC power jack, and works with a Mini-B USB cable instead of a standard one. The Nano was designed and is being produced by Gravitech. The nano model is shown in fig2.

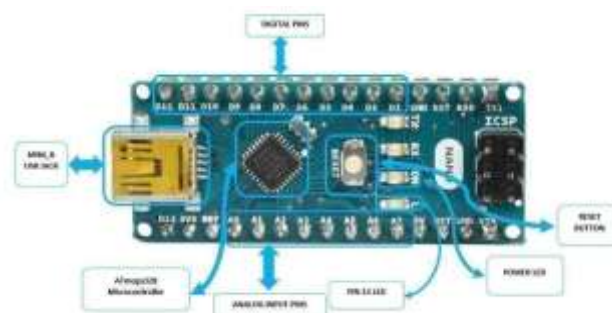


Fig 2:Arduino nano

ULTRASONIC SENSOR

An ultrasonic sensor transmit ultrasonic waves into the air and detects reflected waves from an object. There are many applications for ultrasonic sensors, such as in intrusion alarm systems, automatic door openers and backup sensors for automobiles. Accompanied by the rapid development of information processing technology, new fields of application, such as factory automation equipment and car electronics, are increasing and should continue to do so. Ultra sonic sensor is shown in fig 3. Using its unique piezoelectric ceramics manufacturing technology developed over many years, Murata has developed various types of ultrasonic sensors which are compact and yet have very high performance. The information contained in this catalog will help you to make effective use of our ultrasonic sensors.



Fig 3: ultra sonic sensor

APR9600 VOICE MODULE

Voice Module is a compact easy-control speaking recognition board. It is a speaker-dependent module and supports up to 80 voice commands. Any sound could be trained as command. Users need to train the module first before recognizing any voice command. Voice commands are stored in one large group like a library. Any 7 voice commands in the library could be imported into recognizer. It means 7 commands are effective at the same time. This board has 2 controlling ways: Serial Port (full function), General Input Pins (part of function). General Output Pins on the board could generate several kinds of waves while corresponding voice command was recognized. The moule of apr9600 is shown in fig 4.

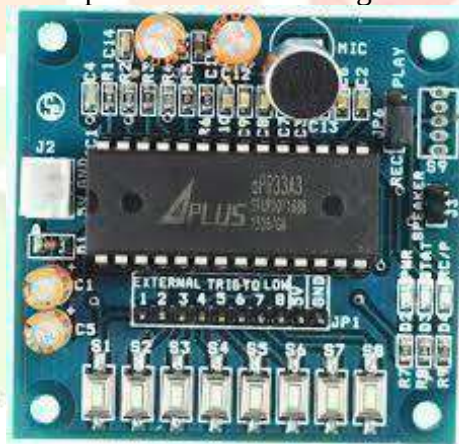


Fig 4: APR Voice module

IV. RESULT

Ultra sonic sensor transmits the signal whenever obstacle occurs it measures the distance it gives result as obstacle is detected. Microcontroller reads whatever sensor transmitted and that transmitted data to voice module. Because of voice module we got output as output is detected in left side direction. The left obstacle image is shown in fig 5.



Fig 5: left obstacle

Ultra sonic sensor transmits the signal whenever obstacle occurs it measures the distance it gives result as obstacle is detected. Microcontroller reads whatever sensor transmitted and that transmitted data to voice module. Because of voice module we got output as output is detected in left side direction. The left obstacle image is shown in fig 5.

Ultra sonic sensor transmits the signal whenever obstacle occurs it measures the distance it gives result as obstacle is detected. Microcontroller reads whatever sensor transmitted and that transmitted data to voice module. Because of voice module we got output as output is detected in forward direction. The forward obstacle image is shown in fig 6.

In our project, an android phone is used for the mobile app purpose and the phone is connected to module through Bluetooth. The sound processing is done by the Arduino Nano, which can send data (obstacle distance) to the user mobile with the help of an android application through a Bluetooth module via UART communication protocol . Here the user can hear the obstacle distance as a voice message from the android phone.

One more purpose of this application software is that it can send a emergency text message to family members of the blind person containing the location detail of the blind person, if emergency. Fig.7 shows the setting option of the mobile application through which the thresh- old distance of the obstacle can and any three emergency contact numbers can be predefined. So that if the visually impaired person gets lost then he/she can send his/her current location through a push button via this app.



Fig 6: forward obstacle



Fig 7: screen setting

The ultrasonic sensor was tested and the result as presented in Table 1 shows that the system worked according to specification at a distance not too far from the user. The buzzer came ON indicating the presence of obstacle on the way of the user.

Table 1: Ultrasonic test results

Sl. No	Distance in cm	Action (Alaram)
1	2	ON
2	5	ON
3	10	ON
4	15	ON
5	20	ON
6	25	ON
7	30	ON
8	31	OFF
9	35	OFF
10	40	OFF

CONCLUSION

The blind Stick acts as a basic platform for the coming generation of more aiding devices to help the visually impaired to navigate safely both indoor and outdoor. It is effective and affordable. It leads to good results in detecting the obstacles on the path of the user in a range of three meters. The system is giving approximate obstacle distance from three sides that is from front, left and right side in the form of audio. a basic platform for the coming generation of more aiding devices to help the visually impaired to navigate safely both indoor and outdoor. It is effective and affordable. It leads to good results in detecting the obstacles on the path of the user in a range of three meters. The system is giving approximate obstacle distance from three sides that is from front, left and right side in the form of audio.

FUTURE SCOPE

In the future, further modifications to enhance the performance of the system will be added. These include: A global positioning method to find the position of the user using the GPS, and GSM modules to communicate the location to a relative or care giver. It should also accommodate wide varying grips for flexible handling. Since the Global Positioning System (GPS) was introduced in the late 1980s there have been many attempts to integrate it into a navigation-assistance system for blind and visually impaired people.

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